AFRICA RISING
THE SUDANO-SAHELIAN MEGA-SITE
SELECTION OF PROJECT IMPLEMENTATION SITES

REPORT PREPARED FOR
INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
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Introduction

The Africa RISING project of the Feed the Future Initiative proposes to initiate and test interventions to enable sustainable intensification of agriculture in three major regions of Africa by working in "mega-sites" which exemplify the main climatic and human characteristics of these regions. The Sikasso region of Mali and the Northern, Upper Eastern and Upper Western Regions of Ghana have been chosen to represent the Sudano-Sahelian mega-site, and results of the initial project will be capable of extrapolation to wide areas of West and Central Africa, as shown in Figures 1 and 2.

This report analyses and stratifies the West African mega-site, and present recommendations for selection of operational sites within the mega-site.

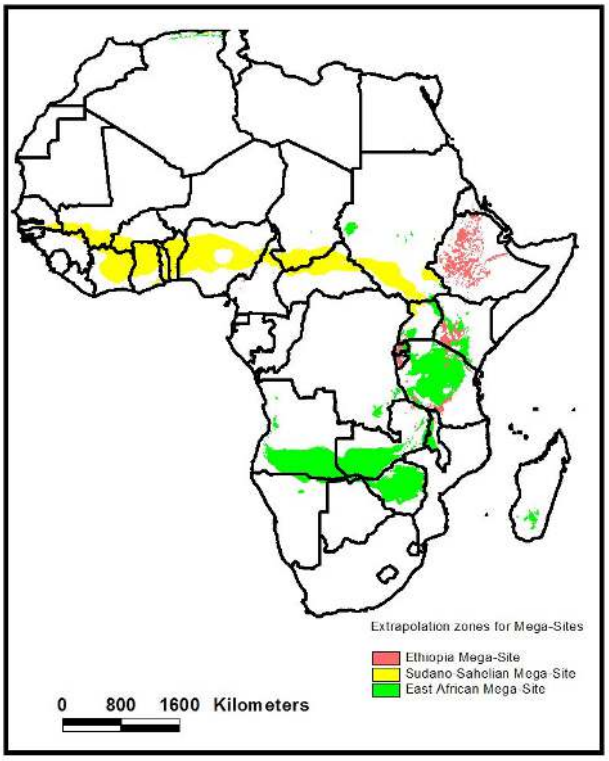


Figure 1. Extrapolation zones for the three African Mega-Sites

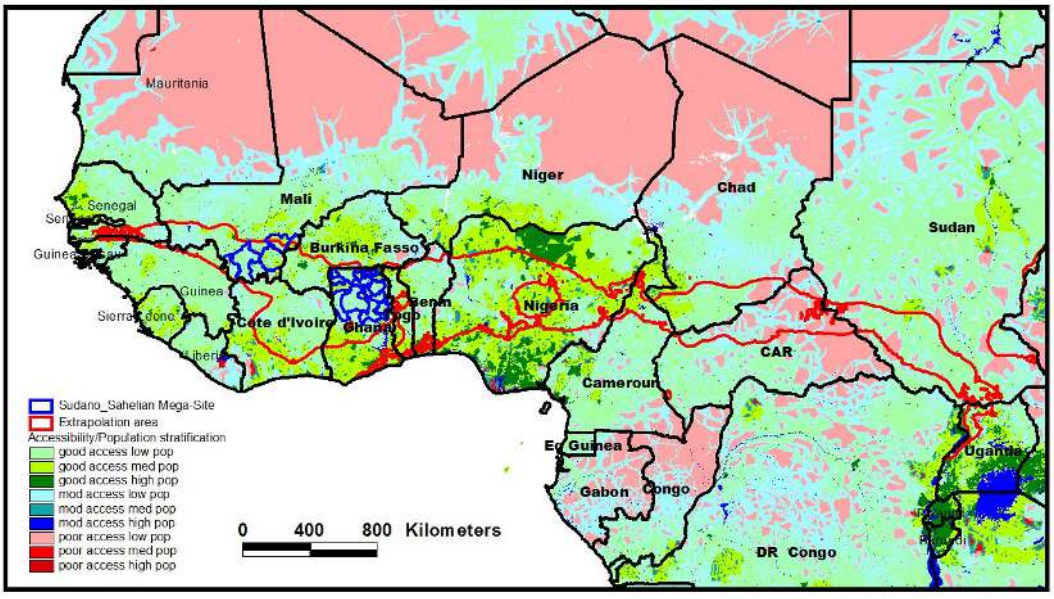


Figure 2. Extrapolation zones for the Sudano-Sahelian Mega Site in West and Central Africa

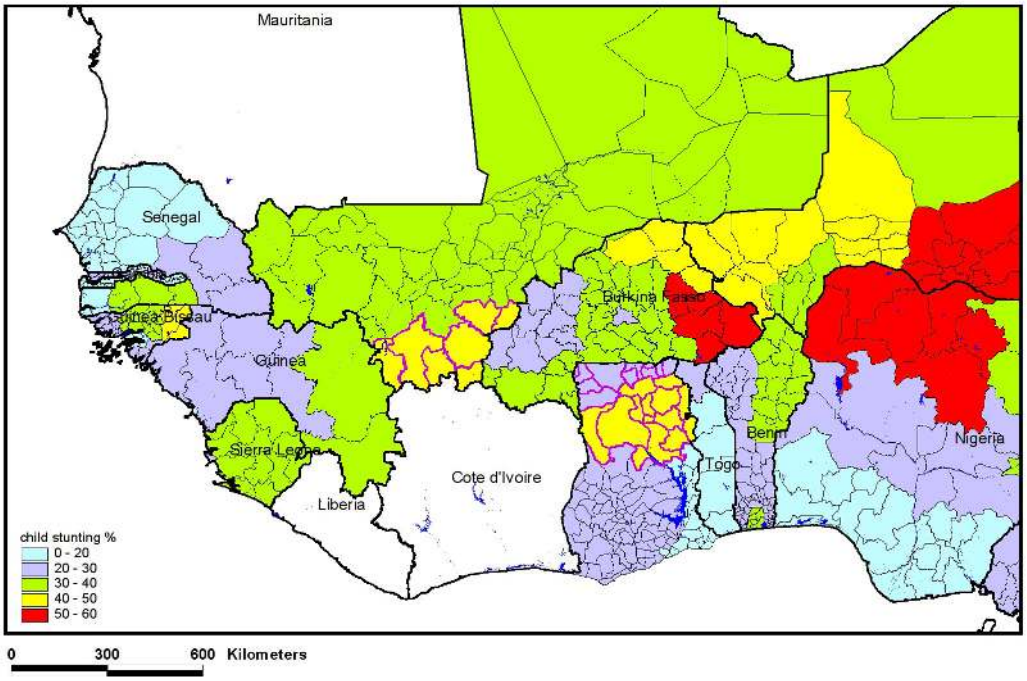
Background to the Mega-Site

According to the December 2011 Concept Note, "The project will focus on the northern regions of Ghana, specifically in the administrative districts of Karaga, Cheroponi, and Tolon-Kumbungu (Northern Region); Kassena-Nankana and Bawku West (Upper East Region); and Wa East and Nadowli (Upper West Region) to address production constraints in rice and cereal-legume production systems. The northern Regions of Ghana are characterized by small land holdings of low input-output farming systems, which adversely impact food security in terms of availability, access and quality and result in a seasonal cycle of food insecurity of 3-5, 4-5 and 6-7 months for cereals (maize, sorghum, millet) and 5-7, 4-5 and 6-7 months (groundnut, cowpea, and soybean) in the Northern, Upper West and Upper East Regions, respectively (Quaye, 2008). These crops in the savannas are often produced in a continuous monoculture in which soil natural resources are steadily depleted and yields per unit area are falling to very low levels. The poverty profile of Ghana also depicts the three northern regions as the most poverty stricken and hunger spots in Ghana (GLSS, 2000). Gender inequalities are also apparent in these regions where women have less access to resources and capacity to generate income.

In Mali the project will focus on the Sikasso region, specifically the circles of Koutiala and Bougouni, The Sikasso region of southern Mali is ecologically similar to northern Ghana, but stretches northwards into drier zones, where maize cultivation is associated with high economic risks. Sorghum is traditionally the lead cereal and staple crop, but both maize and pearl millet are widely cultivated, to exploit specific ecological niches, and marketing opportunities.

The northern part of the Sikasso region, specifically the Koutiala district, is the most intensely farmed area in Mali. Increasing total production by expanding the area cultivated is no longer an option in this area. Maintaining soil fertility and soil health, and reducing soil erosion, while increasing overall productivity are key issues for agricultural development in this area. In contrast the Bougouni district, in the southern part of the Sikasso region is characterized by low population density, large tracts of reserve forests, and very locally diverse cropping situations, ranging from infertile lateritic rock outcrops on hilltops to large inland valley tracts that allow for double cropping, irrigated farming and vegetable production. The potential for fruit tree cultivation is high.

Integrating livestock management with crop production is a key issue for this region, as it is a zone heavily used by transhumant herders for dry-season grazing. This is resulting in serious conflicts with the local resident farming communities. A key research issues for this region is how to support growing livestock herds temporarily, while



increasing crop productivity and maintaining forest cover and diversity."

Figure 3. Child stunting (height for age) in West Africa. Mega-site districts in purple

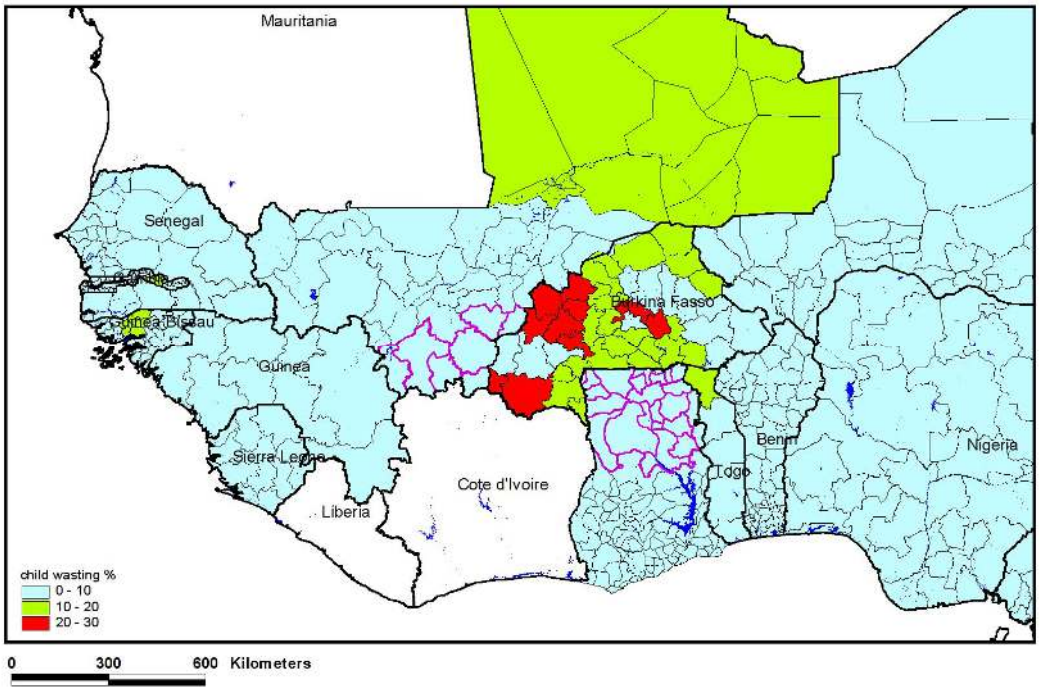


Figure 4. Child Wasting (weight for height) in West Africa. Mega-site districts in purple

Description of Mega-Site

As shown in Figures 3 and 4, the mega-site regions in Mali and Ghana are areas of moderate to high child stunting, but relatively low incidence of wasting. This suggests that long-term malnutrition is common, but that there have not been extreme nutrition events recently.

The topography of the Mega-site (Figure 5) is relatively subdued, with elevations between 100 metres and 400 metres and a generally undulating surface without prominent mountains. The highest land is in the Mali portion of the mega-site, where a plateau zone forms the watershed between major river systems. In common with most of the Sahel, rainfall increases steadily from north to south (Figure 6), with a sharper gradient in Mali due to the highlands. Variation is from less than 900mm to a high of over 1300 mm per year.

Population distribution is shown in Figure 7. Over much of the area, density is quite low, less than 20 persons per square kilometre, but large areas of the eastern portion of the Mali site have densities over 40. Apart from main towns in Ghana and Mali, there are some areas of extremely dense rural population, notably in the Upper Eastern region of Ghana, where there are significant areas with more than 100 persons per square kilometre. Access to markets is generally good to moderate, with poorest access in the western portion of the Mali mega-site and in the south-west of the Ghana site.

The distribution of farming systems in the Mega-site is shown in Figure 9. There is a rough zoning of cropping systems, from sorghum dominated in the north dryer areas, through maize dominated, to maize, yams and rice in the southern wetter districts.. Livestock is most important in the north, in both sorghum and maize systems. Legumes are grown in all districts, and are locally very important.

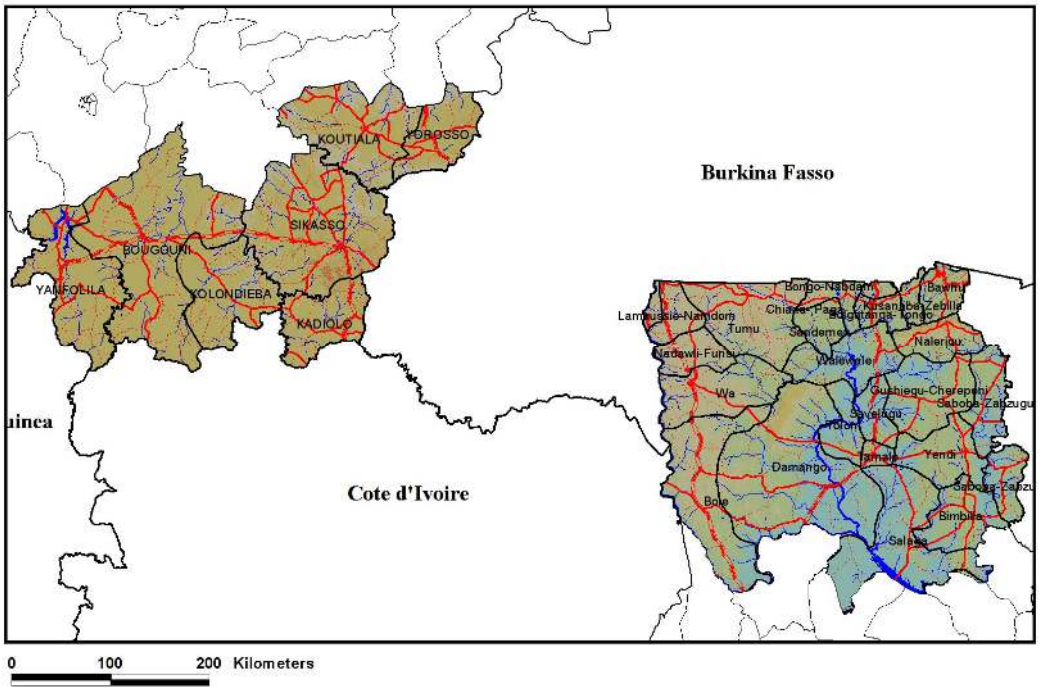


Figure 5. Topography of Sudano-Sahelian mega-site

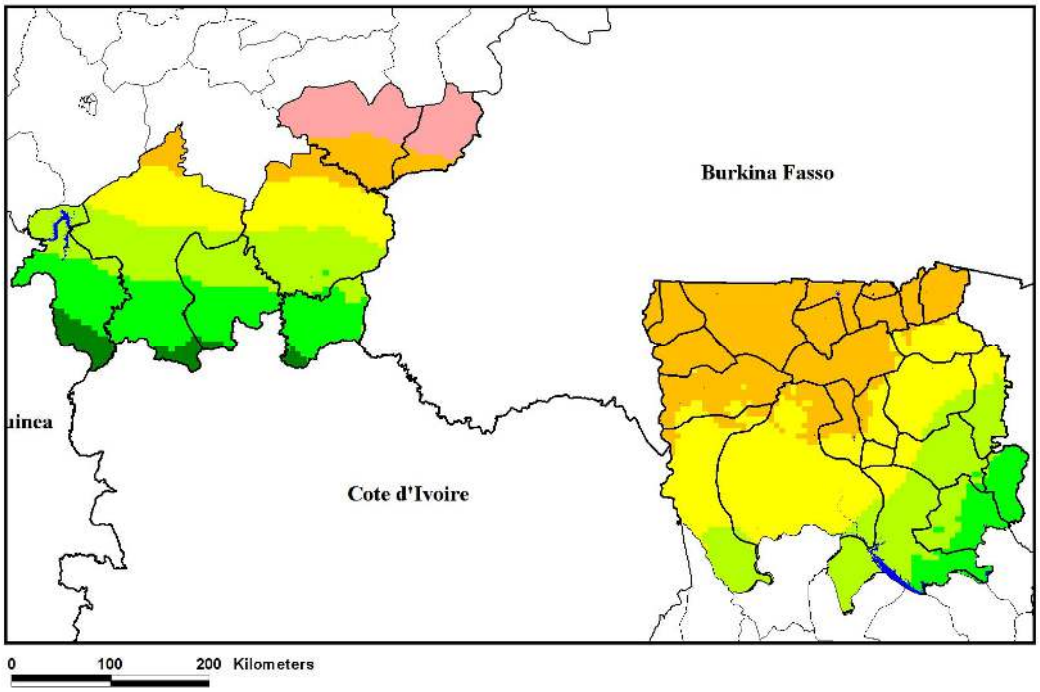


Figure 6. Annual rainfall in Sudano-Sahelian mega-site. From 900mm (pink) to 1300mm (green)

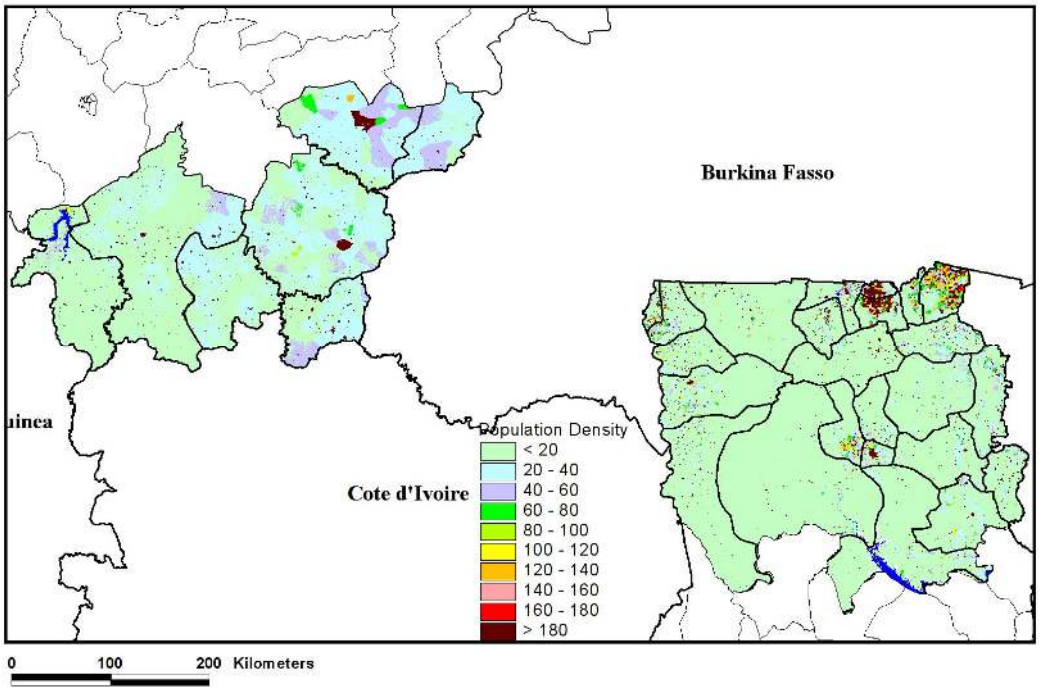


Figure 7. Population density in Sudano-Sahelian mega-site

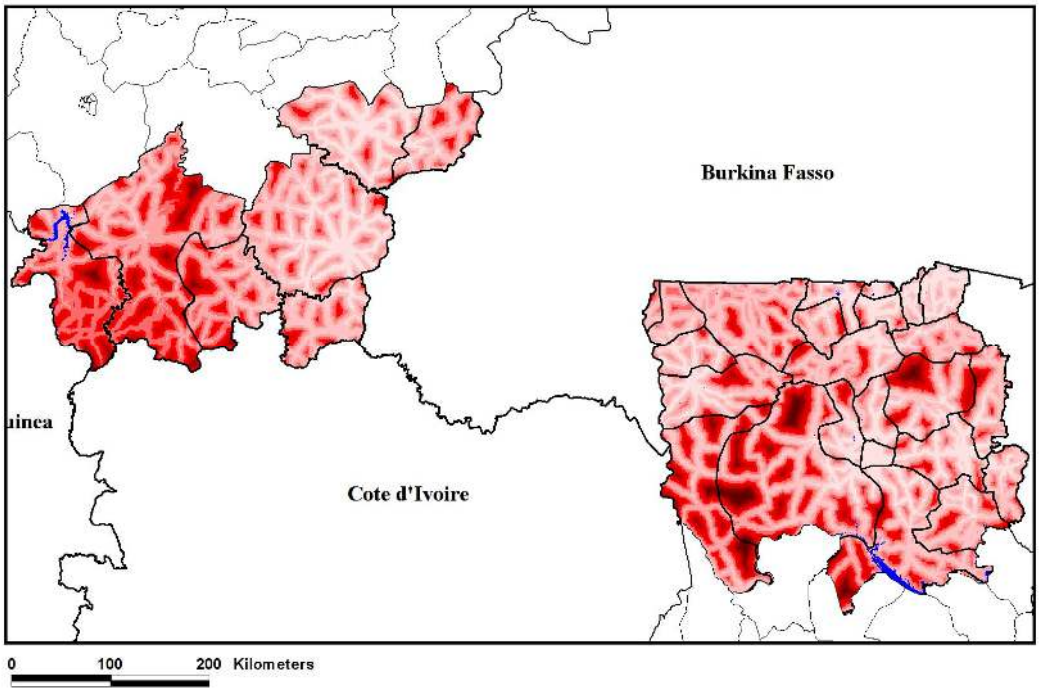


Figure 8. Access to markets in Sudano-Sahelian mega-site. Good access (pale pink) to poor access (red)

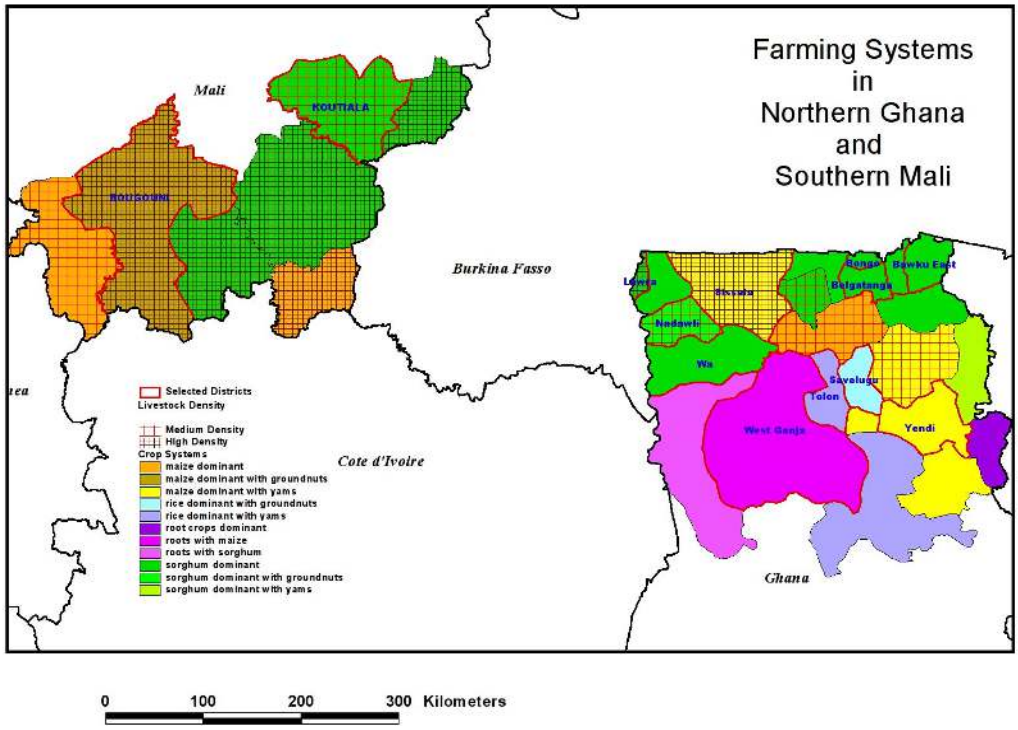


Figure 9. Farming systems in Sudano-Sahelian mega-site

Stratification of the Mega-Site

The mega-site is stratified initially on the basis of the four main variables; rainfall, elevation, population density and market access. These variables are classified as shown in Table 1.

Table 1. Classification of main variables

Category	Population	Rainfall	Elevation	Market Access
1	> 100	< 1000	< 200	good
2	50 - 100	1000 - 1100	200 - 300	moderate
3	30 - 50	1100 - 1200	> 300	poor
4	20 - 30	> 1200		Very poor
5	< 20			

The first step in stratification, since the project emphasises intensification and wishes to reach maximum numbers of farmers, is to remove the few districts that have very low population densities and/or have extremely poor market access. The remaining districts are then grouped into a total of 22 categories based on combinations of the three variables rainfall, elevation and population density, together with dominant cropping systems. This results in the classification shown in Table 2. This table also highlights categories already covered by selected communities (Ghana) and districts or cercles (Mali). Some of the categories are fairly similar, and some include significant contributions from root crops, mainly yams, which are not the target of this project. It is not essential, therefore, that every category is covered by operational sites, but three important categories not covered in current planning are highlighted in yellow.

Table 2. Classification of districts by rainfall, elevation, population and farming system

Class	Description
A	Low rainfall, high elevation, medium population density, sorghum-dominant
B	Medium rainfall, low elevation, high population density, sorghum dominant
C	Medium rainfall, low elevation, low population density, maize dominant
D	Medium rainfall, low elevation, low population density, sorghum dominant
E	Medium rainfall, medium elevation, high population density, sorghum dominant
F	Medium rainfall, medium elevation, medium population, sorghum dominant
G	Medium rainfall, medium elevation, medium population, sorghum dominant, livestock
H	Medium rainfall, medium elevation, medium population, rice/roots
I	Medium rainfall, med/high elevation, low population, sorghum dominant
J	Medium rainfall, med/high elevation, low population, maize/roots
K	High rainfall, low elevation, high population, maize/roots
L	High rainfall, medium elevation, medium population, rice/gnut
M	High rainfall, med/high elevation, low population, sorghum dominant
N	High rainfall, med/high elevation, low population, sorghum dominant, livestock
O	High rainfall, med/high elevation, low population, sorghum/roots
P	High rainfall, med/high elevation, low population, maize/roots
Q	High rainfall, low elevation, low population, maize/roots
R	High rainfall, low elevation, low population, sorghum/roots
S	High rainfall, low elevation, low population, rice/roots
T	High rainfall, high elevation, low population, sorghum dominant
U	High rainfall, high elevation, low population, maize dominant
V	High rainfall, high elevation, low population, maize/gnut

Classes highlighted in cyan have already been selected for operational sites. Classes in yellow should be included for completeness.

The characteristics of all districts not excluded by low population density and poor access are shown in Table 3, together with the classes as outlined in Table 2. Cyan highlighting indicates all districts already selected for operational sites by the Ghana and Mali teams, while pink highlights show districts recommended for sites based on this analysis.

Implications for Site Selection.

A number of districts and sites have already been selected by the Ghana team, as shown in Table 3 and Figure 10. It is apparent that there are some duplications and some important omissions. Three districts in the Upper Eastern Region with Class E characteristics (medium rainfall, medium elevation, high population density and sorghum the dominant cereal have already been selected and initial work undertaken in the communities. Similarly, two selected districts in Upper Western Region have Class I characteristics (medium rainfall, medium/high elevation, low population density and sorghum dominant). Two important classes, N and O, with high rainfall, medium/high elevation, low population density and sorghum dominant with livestock and sorghum/roots respectively, do not have any proposed sites. It is suggested that the sites in Bongo and Kusanaba be abandoned, and new sites selected in Bimbilla and Gushiegu districts.

In Mali, Bougouni and Koutiala cercles have already been selected for project implementation, although individual communities have yet to be selected. It is suggested that Kolondieba cercle be added, since this has a combination of parameters significantly different from the others.

Table 3. Characteristics of districts, very low population density and very poor market access excluded.

REGION	DISTRICT	crop system	popclass	rainclass	elevclass	acclass	CLASS
Northern	Bimbilla	maize_roots	3	4	1	2	P
Northern	Gushiegu-Chereponi	maize_roots	4	3	2	2	O
Northern	Nalerigu	sorghum	2	3	3	2	M
Northern	Saboba-Zabzugu	sorghum_roots	3	4	1	2	Q
Northern	Saboba-Zabzungu	roots	3	4	1	1	R
Northern	Salaga	rice_roots	3	4	1	2	S
Northern	Savelugu	rice_gnt	2	3	1	1	L
Northern	Tamale	maize_roots	1	3	1	1	K
Northern	Tolon	rice_roots	2	2	1	2	H
Northern	Walewale	maize	3	2	1	2	C
Northern	Yendi	maize_roots	3	4	1	1	Q
Upper East	Bawhu	sorghum	1	2	2	1	E
Upper East	Bolgatanga-Tongo	sorghum	1	2	1	1	B
Upper East	Bongo-Nabdam	sorghum	1	2	2	1	E
Upper East	Chiana- Paga	sorghum	1	2	2	1	E
Upper East	Kusanaba-Zebilla	sorghum	1	2	2	1	E
Upper East	Sandemen	sorghum	3	2	1	1	D
Upper West	Lambussie-Namdom	sorghum	2	2	2	1	F
Upper West	Lambussie-Namdom	sorghum	2	2	2	1	G
Upper West	Nadawli-Funsi	sorghum_gnt	3	2	2	2	I
Upper West	Tumu	maize_roots	4	2	3	2	J
Upper West	Wa	sorghum	3	2	2	2	I
SIKASSO	BOUGOUNI	maize_gnt	4	4	3	2	V
SIKASSO	KADIOLO	maize	3	4	3	2	U
SIKASSO	KOLONDIEBA	sorghum	3	4	3	2	T
SIKASSO	KOUTIALA	sorghum	2	1	3	1	A
SIKASSO	SIKASSO	sorghum	3	3	3	1	N
SIKASSO	YOROSSO	sorghum	3	1	3	2	A

Cyan highlighting indicates villages already selected by project management for operational sites.
Pink highlighting indicates districts recommended for sites.

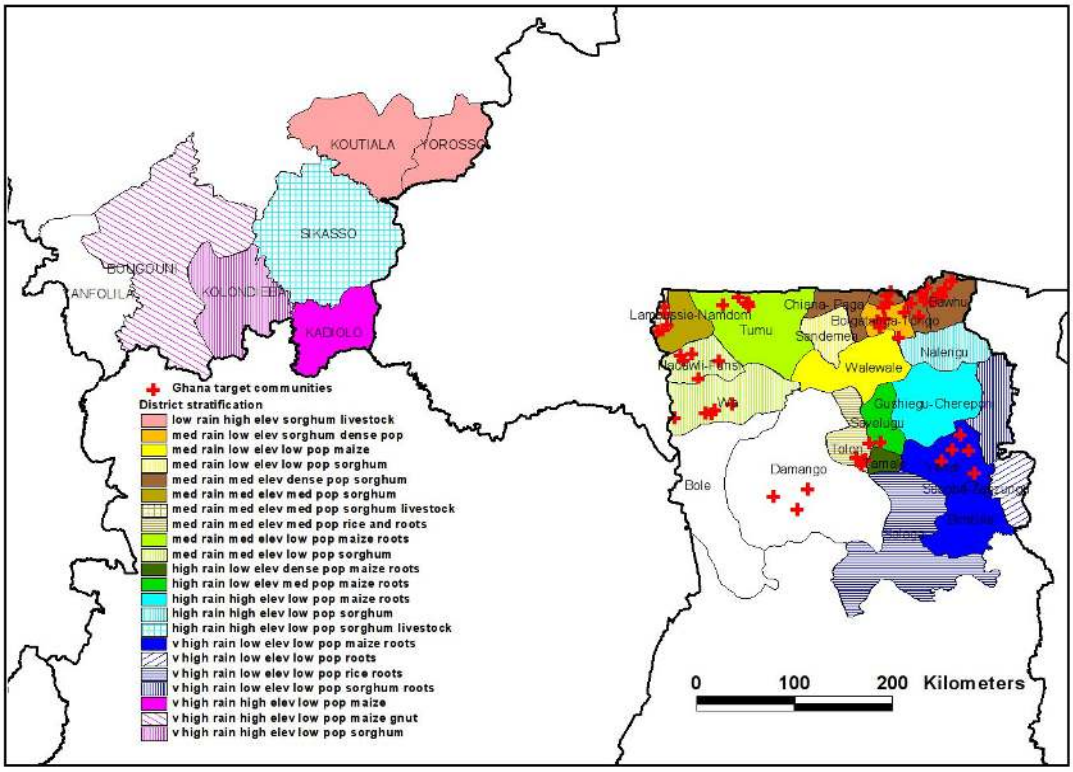


Figure 10. Distribution of stratified Districts. Classes as in Tables 2 and 3. Communities already selected by Ghana team indicated as red crosses.